REMARKS/ARGUMENTS

Reconsideration and continued examination of the above-identified application are respectfully requested.

Rejection of Claims 1-4, 7-13, 29, 43-48, 51, 56, and 59-63 under 35 U.S.C. §102(b) – Ivanov et al. (WO 00/15863)

At page 2 of the Office Action, the Examiner rejects claims 1-4, 7-13, 29, 43-48, 51, 56, and 59-63 under 35 U.S.C. §102(b) as being anticipated by Ivanov et al. (WO 00/15863). The Examiner asserts that Ivanov et al. teaches each of the limitations of the rejected claims. For the following reasons, this rejection is respectfully traversed.

Claim 1 of the present application refers to a method of forming a sputtering target assembly comprising a backing member and a target member. Claim 1 recites several steps. Claim 1 recites that a member having a bonding side has a plurality of projections, and that a second member has a bonding side with a plurality of grooves. Most importantly, for purposes of this rejection, claim 1 recites that the projections be partially deformed to fill at least one groove to form a mechanical bond. Furthermore, claim 1 recites that the member having the grooves is a metal having a melting point higher than that of the metal which comprises the projections. Put another way, the member having the projections is created from a metal that has a lower melting temperature or is a softer metal compared to the metal forming grooves and therefore, the projections deform when contacting the grooves formed from a metal with a higher temperature. This is the total opposite of Ivanov et al. In particular, and referring to the particular sections relied upon by the Examiner, page 6, lines 6-8, of Ivanov et al. specifically states that the "projections 8A from the harder metal penetrate into the softer metal and disrupt the oxide film . . ." In other words, Ivanov et al. specifically states that the metal having the projections is the harder metal and not the softer metal. This is further

confirmed at page 7, lines 13-20, of Ivanov et al., where it states that the portions of the projections are formed on the harder surface. Thus, it is clear that Ivanov et al. relates to a different invention and clearly does not anticipate claim 1 or any of the claims dependent upon claim 1.

As stated in paragraph [0011] of the present application, the heat produced by friction between the surfaces of the projection and grooves causes the projections to soften or deform and fill in the grooves. There is no penetration into the surface of the groove.

In addition, with respect to claim 13, the Examiner refers to Figs. 4-6 of Ivanov et al. to assert that there is a gap formed between at least a portion of the bonding side of the target membrane and a portion of the bonding side of the backing member. The applicants respectfully disagree. It is clear from viewing Figs. 4-6 of Ivanov et al. that there is no gap shown between the two surfaces being joined together even on the peripheral edge. The entire area between the top surface and bottom surface being joined together, as shown in Figs. 4-6, is in contact with each other.

Furthermore, with respect to claim 43 and the claims dependent on claim 43, for the same reasons, these claims which recite a sputtering target assembly would be patentable. Claim 43 specifically recites that the member having a bonding side with a plurality of grooves is the metal having a higher melting point than the metal with the projections. As stated, this is completely the opposite of Ivanov et al., which specifically states that the projections in Ivanov et al. are made from the harder material, which would correlate to a higher melting point.

Furthermore, with respect to claim 46, which recites a gap existing between a portion of the bonding sides, as stated above with respect to claim 13, this is simply not shown in Ivanov et al. This would also be true for claim 47, which recites a particular width of the gap.

For these reasons, this rejection should be withdrawn.

Rejection of Claims 5 and 57 under 35 U.S.C. §103(a) -- Ivanov et al. (WO 00/15863) in view of Ivanov et al. (WO 02/47865)

At page 6 of the Office Action, the Examiner rejects claims 5 and 57 under 35 U.S.C. §103(a) as being unpatentable over Ivanov et al. (WO 00/15863) in view of Ivanov et al. (WO 02/47865). The Examiner relies upon Ivanov et al. '863 in the same manner as above in the §102 rejection. The Examiner relies on Ivanov et al. '865 to assert that it would be obvious that the grooves would comprise tantalum and that the motivation for using tantalum in Ivanov et al. '863 would be that it allows for providing a structure which provides high thermal conductivity and lower electrical conductivity. For the following reasons, this rejection is respectfully traversed.

As stated above, Ivanov et al. '863 does not teach or suggest the claimed invention. Ivanov et al. '863 clearly shows a plurality of projections formed in a harder member of the assembly, which is the complete opposite of the claims of the present application, wherein the projections have a lower melting point than the member having the grooves. Since Ivanov et al. '865 does not overcome this deficiency, the combination of the two references still does not teach or suggest the claimed invention.

In addition, it is respectfully noted that the method of Ivanov et al. '865 is different from the method of Ivanov et al. '863 and, therefore, the two methods are not interchangeable as proposed by the Examiner. Ivanov et al. '865 clearly relates to a method where projections penetrate into grooves on the opposing mating surface and, more importantly, the projection has a smaller size than the grooves so that after penetration, a friction fit joint is formed which is quite different from a mechanical joint. In addition, unlike the present invention, Ivanov et al. '865 does not teach or suggest any "slidably contacting a portion of at least one projection with a portion of at least one groove." Ivanov et al. '865 shows that the two mating members are not slid together, and this is

further confirmed in the figures and examples of Ivanov et al. '865. Thus, in view of the differences between the processes of the two Ivanov et al. references, one would not be able to combine the two methods since they are two different methods. Furthermore, the motivation asserted by the Examiner is not a motivation that would provide justification to use tantalum in Ivanov et al. '863. Ivanov et al. '863 does not describe any problems which are unsolvable with the materials mentioned in Ivanov et al. '863, and page 10, paragraph [0048] of Ivanov et al. '865, simply indicates that the thermal expansion and coefficients are compared with conventional assemblies which use Ta or Ta alloy targets. This, in no way, provides any motivation for one having ordinary skill in the art to take this alleged teaching and incorporate it into Ivanov et al. '863.

For these reasons, this rejection should be withdrawn.

Rejection of Claims 14-17 under 35 U.S.C. §103(a) – Ivanov et al. (WO 00/15863) in view of Ivanov (WO 02/49785)

At the bottom of page 6 of the Office Action, the Examiner rejects claims 14-17 under 35 U.S.C. §103(a) as being unpatentable over Ivanov et al. (WO 00/15863) in view of Ivanov (WO 02/49785). The Examiner relies on Ivanov et al. '863 in the same manner as in the §102 rejection above. The Examiner asserts that Ivanov '785 shows the limitations of claims 14-17 and refers to page 8, paragraph [0036]. The Examiner further asserts that it would be obvious to take these alleged teachings and incorporate them into Ivanov et al. '863 since one of ordinary skill in the art would be motivated to do so for joining of the target and backing plate. For the following reasons, this rejection is respectfully traversed.

The deficiencies of Ivanov et al. '863 mentioned above are incorporated entirely by reference herein. Clearly, Ivanov et al. '863 does not teach or suggest the claimed invention, and Ivanov '785 does not provide any teaching or suggestion of these deficiencies. As stated, Ivanov et

al. '863 shows a plurality of projections formed in the harder member of the assembly, and this is completely the opposite of claims 14-17, which are dependent on claim 1.

In addition, with respect to the Examiner's assertion that Ivanov '785 teaches a groove having a shape that is different from the shape of at least one other groove, the applicants respectfully disagree. Page 8, paragraph [0036] of Ivanov '785 does not state what is alleged by the Examiner. Paragraph [0036] of Ivanov '785 simply states that the protruding portions and grooves can have any mating shape in accordance with Ivanov '785. Paragraph [0036] does not state that two different groove shapes can be present on the same mating surface. This is further confirmed in that paragraph [0036] refers to Figs. 5 and 6, which clearly show the same groove shape for each of the three grooves shown in Figs. 5 and 6. Accordingly, for this additional reason, the cited references do not teach or suggest the claimed invention.

Furthermore, with respect to the Examiner's alleged motivation for combining these references, neither reference provides any motivation to combine portions of one reference to the other reference. The Examiner has not cited any particular portion of either reference to provide proper motivation on why one skilled in the art would find proper motivation to combine one aspect of the cited reference with another reference.

For these reasons, this rejection should be withdrawn.

Rejection of Claim 18-28 under 35 U.S.C. §103(a) – Ivanov et al. (WO 00/15863) in view of Stellrecht (U.S. Patent No. 5,342,496)

At page 8 of the Office Action, the Examiner rejects claims 18-28 under 35 U.S.C. §103(a) as being unpatentable over Ivanov et al. (WO 00/15863) in view of Stellrecht (U.S. Patent No. 5,342,496). The Examiner relies on Ivanov et al. '863 in the same manner as in the above rejections. The Examiner asserts that Stellrecht relates to friction welding and that it would be obvious to

utilize friction welding in Ivanov et al. '863 because "it allows for improving thermal expansion and cooling properties of the target." For the following reasons, this rejection is respectfully traversed.

As stated above, Ivanov et al. '863 does not teach or suggest the claimed invention. As a summary, Ivanov et al. '863 clearly relates to a plurality of projections formed in a harder member of the assembly, which is the complete opposite of the claimed invention. For this reason alone, the rejection should be withdrawn since Stellrecht does not overcome these deficiencies.

Furthermore, Stellrecht, for instance, at page 3, lines 4-14, clearly states that friction welding involves enough friction energy to melt a layer of both materials and weld the two materials together once the rotation is stopped. This is completely different from the method of Ivanov et al. '863. Ivanov et al. '863, for instance, at page 6, lines 11-16, states that low temperature pressure consolidation is used, which would be quite the opposite of creating sufficient friction energy to melt and weld two metal materials together. In addition, Ivanov et al. '863 does not teach any rotation of any material while the other opposing mating surface is held stationary. In addition, Stellrecht does not relate to any mating surfaces which have projection and groove surfaces.

Furthermore, with respect to the Examiner's alleged motivation for combining the two references, the motivation is not understood. There is no teaching or suggestion or problems identified in Ivanov et al. '863 that would cause one skilled in the art to look to the teachings of Stellrecht, which relates to a completely different joining process and relates to an actual welding of two metals which causes the melting of the metals. This is very different from the low temperature pressure consolidation of Ivanov et al. '863. Furthermore, Stellrecht et al. does not provide any teaching or suggestion or motivation to take a portion of the process of Stellrecht and use it in a completely different process, such as the process of Ivanov et al. '863.

Accordingly, for these reasons, the cited references do not teach or suggest the claimed

invention and the rejection should be withdrawn.

Rejection of Claims 30-33 and 52-55 under 35 U.S.C. §103(a) – Ivanov et al. (WO 00/15863) in view of Kunihiro et al. (JP 61-291967)

At page 9 of the Office Action, the Examiner rejects claims 30-33 and 52-55 under 35 U.S.C. §103(a) as being unpatentable over Ivanov et al. (WO 00/15863) in view of Kunihiro et al. (JP 61-291967). The Examiner relies on Ivanov et al. '863 in the same manner as described above in the earlier rejections. The Examiner relies on Kunihiro et al. to assert that it would be obvious to use solder material on at least one projection or on at least one groove and that the motivation to do so would be to allow for bonding of the metal directly to the backing plate. For the following reasons, this rejection is respectfully traversed.

In this rejection, the Examiner is relying on only the abstract of Kunihiro et al. and no full English translation of Kunihiro et al. has been provided. With respect to the reference relied upon by the Examiner wherein only an abstract is provided, the full English translation of the entire document needs to be provided to make the record clear as to the precise facts that the Examiner is relying upon to support the rejection. Accordingly, the Examiner is respectfully requested to provide a full English translation of the document, as opposed to simply relying on the abstract for purposes of this rejection, should the Examiner maintain the rejection. The applicants' representative (the undersigned) has not had an opportunity to fully respond to the allegations made by the Examiner in view of the abstract. As set forth in MPEP 706.2, if a document is in a language other than English and the Examiner seeks to rely on that document, a translation must be obtained so that the record is clear as to the precise facts the Examiner is relying upon to support the rejection. As stated in the MPEP 706.2, it is possible, for example, for a document to teach away from a claimed invention even when the abstract alone seems to support the

rejection. Thus, the applicants' representative has been denied the opportunity to consider the full text of the cited documents and prepare a response based on the fullest set of available facts.

With respect to the substance of the rejection, Ivanov et al. '863 does not teach or suggest the claimed invention as described above and Kunihiro et al. does not provide any of the deficiencies. Therefore, for this reason alone, this rejection should be withdrawn.

Moreover, one skilled in the art would not combine the teachings of Kunihiro et al. with Ivanov et al. '863. Ivanov et al. '863 uses low temperature pressure consolidation wherein the projections from the harder metal penetrate into the softer metal and disrupts the oxide film that may exist along the interface, thereby promoting a metal-to-metal cold diffusion-type bond (see page 6, lines 6-12 of Ivanov et al. '863). If a solder is used in the projection or groove, the very purpose of Ivanov et al. '863 would be ignored. Clearly, by using soldering, a metal-to-metal cold diffusion-type bond would not be achieved between the mating surfaces since the solder would be interfering with this metal-to-metal cold diffusion-type bond. For this reason alone, Ivanov et al. '863 teaches away from using any intermediate joining material between the projection and groove. In addition, to the extent that Kunihiro et al. can be understood, since only an abstract is provided by the Examiner, this reference appears to show no "slidably contacting a portion of at least one projection with a portion of at least one groove" and further shows no deforming of any projection to form a mechanical bond. Clearly, the techniques set forth in Kunihiro et al. are completely different from the methods of Ivanov et al. '863 and neither reference provides any motivation to combine the methods together as proposed by the Examiner. The Examiner's alleged motivation to combine the teachings by asserting that it allows for bonding the metal directly to a backing plate is not understood and does not provide any motivation for using soldering steps in Ivanov et al. '863, especially when Ivanov et al. '863 specifically states that the harder metal must penetrate the softer

metal and disrupt the oxide film and thereby promote a metal-to-metal cold diffusion-type bond. Clearly, there would be no motivation to combine these two very different methods.

For these reasons, this rejection should be withdrawn.

Rejection of Claims 34-36, 38, 49, and 50 under 35 U.S.C. §103(a) – Ivanov et al. (WO 00/15863) in view of Wegmann (U.S. Patent No. 4,983,269)

At the bottom of page 9 of the Office Action, the Examiner rejects claims 34-36, 38, 49, and 50 under 35 U.S.C. §103(a) as being unpatentable over Ivanov et al. (WO 00/15863) in view of Wegmann (U.S. Patent No. 4,983,269). The Examiner relies on Ivanov et al. '863 in the same manner as in the previous rejections. With respect to Wegmann, the Examiner asserts that Wegmann shows the formation of a cell member and that one skilled in the art would be motivated to use this cell member in Ivanov et al. '863 because it allows for detecting erosion of the targets. For the following reasons, this rejection is respectfully traversed.

The deficiencies of Ivanov et al. '863, as described above, apply equally here, and Wegmann does not overcome these deficiencies. Accordingly, since each of the rejected claims is dependent ultimately on claim 1 or claim 43, this rejection should be withdrawn.

Furthermore, it is questionable whether the method for erosion detection of Wegmann can be incorporated into Ivanov et al. '863 since no motivation to make such a modification to Ivanov et al. '863 is shown in either reference.

For these reasons, this rejection should be withdrawn as well.

Rejection of Claim 37 under 35 U.S.C. §103(a) – Ivanov et al. (WO 00/15863) in view of Wegmann et al. (U.S. Patent No. 4,983,269) and further in view of Stellrecht (U.S. Patent No. 5,342,496)

At the bottom of page 10 of the Office Action, the Examiner rejects claim 37 under 35 U.S.C. §103(a) as being unpatentable over Ivanov et al. (WO 00/15863) in view of Wegmann (U.S. Patent No. 4,983,269) and further in view of Stellrecht (U.S. Patent No. 5,342,496). The Examiner asserts that it would be obvious to use argon in the cell and, therefore, it would be obvious to use argon in view of Stellrecht. For the following reasons, this rejection is respectfully traversed.

Claim 37 is ultimately dependent on claim 1. As noted previously, Ivanov et al. '863 does not teach or suggest the claimed invention, and Wegmann and Stellrecht do not overcome these deficiencies. For this reason alone, this rejection should be withdrawn. The motivation to combine Wegmann and Stellrecht with Ivanov et al. '863 has been addressed above, and for this reason as well, the rejection should be withdrawn.

Rejection of Claims 39-42 under 35 U.S.C. §103(a) -- Ivanov et al. (WO 00/15863) in view of Hunt et al. (U.S. Patent No. 5,836,506)

At page 11 of the Office Action, the Examiner rejects claims 39-42 under 35 U.S.C. §103(a) as being unpatentable over Ivanov et al. (WO 00/15863) in view of Hunt (U.S. Patent No. 5,836,506). The Examiner relies on Ivanov et al. '863 in the same manner as described above in the previous rejections. The Examiner asserts that it would be obvious to form a sputtering target under a cover gas using an inert gas, such as argon, in view of Hunt et al. For the following reasons, this rejection is respectfully traversed.

Dependent claims 39-42 are ultimately dependent on claim 1. As stated above, Ivanov et al. '863 does not teach or suggest the subject matter of claim 1 or the claims dependent thereon, and

Hunt et al. does not overcome these deficiencies. For these reasons alone, this rejection should be withdrawn.

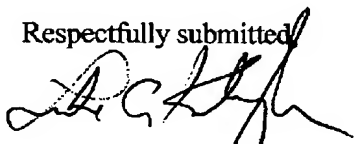
The Examiner is encouraged to contact the undersigned should there be any remaining questions as to the patentability of the claimed invention in view of the cited references.

CONCLUSION

In view of the foregoing remarks, the applicant respectfully requests the reconsideration of this application and the timely allowance of the pending claims.

If there are any fees due in connection with the filing of this response, please charge the fees to Deposit Account No. 03-0060. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such extension is requested and should also be charged to said Deposit Account.

Respectfully submitted,



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